Billings Public Schools
Algebra 2 Planning Guide --- Alignment with CCSS

Chapter 1: Equations & Inequalities
Most of this chapter was introduced in Alg 1, take to an appropriate Alg 2 level.

Objectives:

The student will be able to:
- Evaluate and solve linear equations and inequalities
- Solve absolute value equations and inequalities

Essential Questions:
- How do you use inverse operations to solve linear equations and inequalities?
- How do you use inverse operations to solve linear equations and inequalities to obtain multiple solutions?

Textbook Resource	CCSS	Comments	Other Resources
1.2 Evaluate & Simplify Algebraic Expressions/ 1.3 Solve Linear Equations Pacing: **1-2 Days**	**A.SSE.1 – Interpret expressions that represent a quantity in terms of its context.** **a. Interpret parts of an expression, such as terms, factors, and coefficients.** **b. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example interpret $P(1 + r)^n$ as the product of P and a factor not depending on P.** • Define and recognize parts of an expression, such as terms, factors, and coefficients • Interpret parts of an expression, such as terms, factors, and coefficients in terms of the context		

Note: If a chapter section is not listed, it is meant to be skipped.
~~Strike-through~~ means that the standard appears at a different time.
**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

	• Interpret complicated expressions, in terms of the context, by viewing one or more of their parts as a single entity		
1.4 Rewrite Formulas & Equations Pacing: **1 Day**	**A.CED.4 – Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.** • Define a quantity of interest to mean any numerical or algebraic quantity (e.g., 2(a/b)=d in which 2 is the quantity of interest showing that d must be even; $(\pi r2h/3)=V_{cone}$ and $\pi r^2h=V_{cylinder}$ showing that $V_{cylinder}=3*V_{cone}$) • Rearrange formulas to highlight a quantity of interest using the same reasoning as in solving equations. (e.g., πr^2 can be re-written as $(\pi r)r$ which makes the form of this expression resemble Bh. The quantity of interest could also be $(a + b)_n = a_nb_0 + a_{(n-1)}b_1 +...+ a_0b_n$)		
1.6 Solve Linear Inequalities Pacing: **1 Day**	**A.CED.1 – Create equations and inequalities in one variable and use them to solve problems from a variety of contexts (e.g., science, history, and culture), including those of Montana American Indians. Include equations arising from linear ~~and quadratic functions, and simple rational and exponential~~ functions.** • Describe the relationships between the quantities in the problem (for example, how the quantities are changing or growing with respect to each other); express these relationships using mathematical operations to create an appropriate equation or inequality to solve. • Use all available types of functions to create such equations, including root functions, but constrain to simple cases • Compare and contrast problems that can be solved by different types of equations • Compare and contrast problems that can be solved by different types of	**A.CED.1 appears throughout the year** **Find activities that include science, history, culture, and IEFA**	

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

	equations (linear, exponential) • Solve linear and exponential equations in one variable • Solve inequalities in one variable • Solve all available types of equations and inequalities including root equations and inequalities, in one variable • Create equations and inequalities in one variable and use them to solve problems • Create equations and inequalities in one variable to model real-world situations • Create equations (linear, exponential) and inequalities in one variable and use them to solve problems		
1.7 Solve Absolute Value Equations & Inequalities Pacing: **1 Day**	**A.CED.1**	**Find activities that include science, history, culture, and IEFA**	http://www.doe.virginia.gov/testing/solsearch/sol/math/AII/m_ess_a2-4a.pdf
Chapter 1 Project Pacing: **1 Day**			*McDougall Littell EasyPlanner has projects for each chapter. These are also saved in the common dropbox* Explorations in Core Math Performance Task Page 33-34 See"On Core Mathematics" Focus on Modeling at the end of most chapters
Assessment Pacing: **1 Day** **Total: 6-7 Days**			

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

Chapter 2: Linear Equations & Functions

Domain/Range, function notation, and vertical line test covered in Alg 1; they should be continually applied through this course.

Objectives:

The student will be able to:

- Evaluate and solve linear equations and inequalities
- Solve absolute value equations and inequalities

Essential Questions:

- How do you use inverse operations to solve linear equations and inequalities?
- How do you use inverse operations to solve linear equations and inequalities to obtain multiple solutions?

Textbook Resource	CCSS	Comments	Other Resources
2.2 Find Slope & Rate of Change Pacing: **1 Day**	**F.IF.6 – Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over specified interval. Estimate the rate of change from a graph.** • Recognize slope as an average rate of change • Estimate the rate of change from a linear or exponential graph • Interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval • Calculate the average rate of change of a function (presented symbolically or as a table) over a specified interval	**2.2-2.4 review linear equations from Alg 1**	Review Activity: http://illuminations.nctm.org/Lessons/PiLine/PiLine-AS-Slope.pdf
2.3 Graph Equations of Lines/2.4 Write Equations of Lines	**F.IF.4 – For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts;**	**F.IF.4 is a year-long standard that occurs throughout the year.**	

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

Pacing: **2 Days**	**intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.** • Define and recognize key features in tables and graphs of linear and exponential functions; intercepts; intervals where the function is increasing, decreasing, positive, or negative, and end behavior • Define and recognize key features in tables and graphs of linear, ~~exponential, and quadratic functions~~: intercepts; intervals where the function is increasing, decreasing, positive, or negative, ~~relative maximums, symmetries,~~ end behavior ~~and periodicity~~ • Identify the type of function, given a table or graph • ~~Identify whether a function is linear or exponential, given its table or graph~~ • Interpret key features of graphs and tables of functions in terms of the contextual quantities each function represents • Sketch graphs showing the key features of a function, modeling a relationship between two quantities, given a verbal description of the relationship **F.IF.5 – Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.** • Identify and describe the domain of a function, given the graph or a verbal/written description of a function • Identify an appropriate domain based on the unit, quantity, and type of function it describes • Relate the domain of a function to its graph and to the quantitative relationship it describes, where applicable • Explain why a domain is appropriate for a given situation **F.IF.6** **F.IF.7 – Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases** **b. ~~Graph square root, cube root, and piecewise-defined~~**	**Begin using technology**	

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

	~~**functions, including step functions and absolute value functions.**~~ ~~**e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.**~~ • Determine the difference between simple and complicated polynomial functions • Determine the difference between simple and complicated linear, ~~quadratic, square root, cube root, and piecewise-defined functions~~ • ~~Determine the differences between simple and complicated linear and exponential functions and know when the use of technology is appropriate • Compare and contrast absolute value, step-and piecewise-defined functions with linear, quadratic, and exponential functions~~ • ~~Compare and contrast the domain and range of absolute value, step-and piecewise-defined functions with linear, quadratic, and exponential functions~~ • ~~Compare and contrast the domain and range of exponential, logarithmic, and trigonometric functions with linear, quadratic, absolute value, step- and piecewise-defined functions~~ • ~~Analyze the difference between simple and complicated linear, quadratic, square root, cube root, piecewise-defined, exponential, logarithmic, and trigonometric functions, including step and absolute value functions~~ • Select the appropriate type of function, taking into consideration the key features, domain, and range, to model a real-world situation • Graph linear functions by hand in simple cases or using technology for more complicated cases and show/label intercepts of the graph		
2.7 Use Absolute Value Functions & Transformations Pacing: **4 days**	**** F.IF.7 – Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases** **b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.**	need additional resources for step and piecewise functions placecards	Piecewise Function; pg 130-131 Step Functions; pg 131 StepFunctions CellPhoneRange(TI84) Emphasize Sect 2.7 #21-26

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

2.8 Graph Linear Inequalities in Two Variables Pacing: **1 Day**	**A.CED.3 – Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.** • Recognize when a modeling context involves constraints • Interpret solutions as viable or nonviable options in a modeling context • Determine when a problem should be represented by equations, inequalities, systems of equations and/or inequalities • Represent constraints by equations or inequalities, and by systems of equations and/or inequalities		
Chapter 2 Project Pacing: **1 Day**			See McDougall Littell EasyPlanner and shared dropbox Explorations in Core Math Performance Task Pages 379-380 See"On Core Mathematics" Focus on Modeling at the end of most chapters
Assessment Pacing: **3 Days** **Total: 12 Days**			

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

Chapter 3: Linear Systems & Matrices

Objectives:

The student will be able to:

- Evaluate and solve linear equations and inequalities
- Solve absolute value equations and inequalities

Essential Questions:

- How do you use inverse operations to solve linear equations and inequalities?
- How do you use inverse operations to solve linear equations and inequalities to obtain multiple solutions?

Textbook Resource	CCSS	Comments	Other Resources
3.1 Solve Linear Systems by Graphing/3.3 Graph Systems of Linear Inequalities Pacing: **1 day**	**A.REI.11 – Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, ~~polynomial, rational~~, absolute value, ~~exponential, and logarithmic~~ functions.** • Recognize and use function notation to represent linear ~~and exponential~~ equations • Recognize that if (x_1, y_1) and (x_2, y_2) share the same location in the coordinate plane that $x_1 = x_2$ and $y_1 = y_2$ • Recognize that f(x) = g(x) means that there may be particular inputs of f and g for which the outputs of f and g are equal • Recognize and use function notation to represent linear, ~~polynomial, rational, absolute value, exponential, and radical~~ equations • Explain why the x-coordinates of the points where the graph of the		

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

	equations y = f(x) and y = g(x) intersect are the solutions of the equations f(x) = g(x) • Approximate/find the solution(s) using an appropriate method. For example, using technology to graph the functions, make tables of values or find successive approximations. **A.CED.2 – Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.** • Identify the quantities in a mathematical problem or real-world situation that should be represented by distinct variables and describe what quantities the variable represent • Graph one or more created equation on coordinate axes with appropriate labels and scales • Justify which quantities in a mathematical problem or real-world situation are dependent and independent of one another and which operations represent those relationships • Determine appropriate units for the labels and scale of graph depicting the relationship between equations created in two or more variables • Create at least two equations in two or more variables to represent relationships between quantities **A.CED.3 – Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.** • Recognize when a modeling context involves constraints • Interpret solutions as viable or nonviable options in a modeling context • Determine when a problem should be represented by equations, inequalities, systems of equations and/or inequalities • Represent constraints by equations or inequalities, and by systems of equations and/or inequalities		

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

3.2 Solve Linear Systems Algebraically Pacing: **2 days**	**A.CED.2** **A.CED.3**		http://www.amstat.org/education/stew/pdfs/AnAmazingComparison.pdf
3.4 Solve Systems of Linear Equations in Three Variables Pacing: **2 days**	**A.CED.2** **A.CED.3**	**Systems with 2 variables done in Alg 1, 3 variables is a new idea.**	
3.3 Extension Linear Programming (pg. 174) Pacing: **1-2 days**	**A.CED.3**	**This is a new idea.**	pg. 174 - 176 http://illuminations.nctm.org/Lessons/Dirtbike/DirtBike-AS-Packet.pdf (This activity may have been used in previous courses.) http://www.regentsprep.org/Regents/math/ALGEBRA/AE9/GrIneqTR.htm Linear Programming Example
Chapter 3 Project Pacing: **1 Day**			See McDougall Littell EasyPlanner and shared Dropbox Need performance task for Chapter 14 See"On Core Mathematics" Focus on Modeling at the end of most chapters

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

Assessment Pacing: **2 Days** **Total: 10 Days**			

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

Chapter 4: Quadratic Functions & Factoring

Recommend that you split Chapter 4 into two units (4.1-4.5, and 4.6-4.10) for assessment.

Part 1 Objectives:

The student will be able to:

- Graph and identify key features of a quadratic function in standard form, vertex form, & intercept form
- Solve quadratic equations by factoring and finding square roots

Part 1 Essential Questions:

- What is the standard form of a quadratic function and how can you use the key features of this form to help you graph?
- What is the vertex form of a quadratic function and how can you use the key features of this form to help you graph?
- What is the intercept form of a quadratic function and how can you use the key features of this form to help you graph?
- Which form of the quadratic is the most appropriate for showing zeroes and symmetry of a graph in terms of a real-world context?
- What is the difference in factoring $x^2 + bx + c = 0$ and $ax^2 + bx + c = 0$ when solving?
- When can you use square roots to solve a quadratic equation?

Part 2 Objectives:

The student will be able to:

- Define i and write complex numbers in the form a+bi using the four operations
- Solve quadratic equations with real coefficients that have complex solutions
- Solve quadratic equations by completing the square and using the quadratic formula
- Solve and graph quadratic inequalities
- Create equations in two variable to represent quadratic relationships between data points

Part 2 Essential Questions:

- What is a complex number and how would you describe the complex number system?
- How do you use the four operations to simplify complex numbers?
- How will you know if a quadratic equation will have complex solutions?
- What is the importance of the discriminant when using the quadratic formula to solve?
- How are the solutions of quadratic inequalities related to compound inequalities ("and" vs. an "or")?

Textbook Resource	CCSS	Comments	Other Resources
4.1 Graphing Quadratic Functions in Standard Form Pacing: **2 Days**	**A.SSE.1 – Interpret expressions that represent a quantity in terms of its context.** **a. Interpret parts of an expression, such as terms, factors, and coefficients.** **F.IF.7 – Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.** • Graph polynomial functions, by hand in simple cases or using technology for more complicated cases, and show/label maxima and minima of the graph, identify zeroes when suitable factorizations are available, and show end behavior **F.IF.8 – ~~Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.~~** **~~a. Use the process of factoring and completing the square in a quadratic function to show zeroes, extreme values, and symmetry of the graph, and interpret these in terms of a context.~~** **~~b. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as y = (1.02)t, y = (0.97)t y = (1.01)12t, y = (1.2)/10, and classify them as representing exponential growth or decay.~~**		**F.BF.3: Needs more resources for f(x) & k.** On Core: Page 31- 40

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

	• ~~Identify different forms of a quadratic expression~~ • Identify zeroes, extreme values, and symmetry of the graph of a quadratic function • ~~Write functions in equivalent forms using the process of factoring~~ **F.BF.3– Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. ~~Include recognizing even and odd functions from their graphs and algebraic expressions for them.~~** • Given a single transformation on a function symbolic or graphic identify the effect on the graph • Using technology, identify effects of single transformations on graphs of functions • Recognize even and odd functions from their graphs and equations • Describe the differences and similarities between a parent function and the transformed function • Find the value of k, given the graphs of a parent function, f(x), and the transformed function; f(x) + k, k f(x), f(kx), or f(x + k) • Experiment with cases and illustrate an explanation of the effects on a graph, using technology • Graph a given function by replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative)	• **This may have been briefly introduced in 1st semester Alg 1.** • **Use the notation that is in the Alg 2 book.** • **We'll revisit even/odd when farther into CC Alignment (it's currently in Alg 3)**	
4.2 Graph Quadratic Functions in Vertex or Intercept Form Pacing: **2 days**	**A.SSE.1** **F.IF.7** **F.IF.8 - Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.** **a. Use the process of factoring and completing the square in a quadratic function to show zeroes, extreme values, and symmetry of the graph, and interpret these in terms of a context.**		CSI:Intercept Form CSI:Vertex From On Core: Page 41 -58

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

	~~**b. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as y = (1.02)t, y = (0.97)t y = (1.01)12t, y = (1.2)/10, and classify them as representing exponential growth or decay.**~~ •-Identify different forms of a quadratic expression • Identify zeroes, extreme values, and symmetry of the graph of a quadratic function • Write functions in equivalent forms using the process of factoring **F.BF.3**		
4.3 Solve $x^2+bx+c=0$ by Factoring Pacing: **2 days**	**A.SSE.2 – Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.** • Identify ways to rewrite expressions, such as difference of squares, factoring out a common monomial, and regrouping • Identify various structures of expressions • Use the structure of an expression to identify ways to rewrite it • Classify expressions by structure and develop strategies to assist in classification **A.REI.11 – Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are ~~linear~~, polynomial, ~~rational, absolute value, exponential, logarithmic functions.~~** • Approximate/find the solution(s) using an appropriate method. For example, using technology to graph the functions, make tables of values or find successive approximations		On Core: Page 59
4.4 Solve $ax^2+bx+c=0$ by	**A.SSE.2**		

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

factoring Pacing: **2 days**	**A.REI.11**		
4.5 Solve Quadratic Equations Finding Square Roots Pacing: **2 Days**	**A.REI.11**	**Simplifying radicals and rationalizing denominators is a skill needed throughout CCSS.**	
Suggestion: Split ch 4 into two tests. Test 4.1 - 4.5 here.			

4.6 Perform Operations with Complex Numbers Pacing: **2 Days**	**A.REI.11** ****N.CN.1 – Know there is a complex number i such that $i^2 = -1$ and every complex number has the form a + bi with a and b real numbers.** • Define i as $\sqrt{-1}$ or $i^2 = -1$ • Define complex numbers • Write complex numbers in the form a + bi with a and b being real numbers ****N.CN.2 – Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.** • Know that the commutative, associative, and distributive properties extend to the set of complex numbers over the operations of addition and multiplication • Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers ****N.CN.7 – Solve quadratic equations with real coefficients that have complex solutions.** • Solve quadratic equations with real coefficients that have complex solutions ****N.CN.8 - (+) Extend polynomial identities to the complex numbers. For example, rewrite $x^2 + 4$ as (x+2i)(x-2i).** • explain that an identity shows a relationship between two quantities, or expressions, that is true for all values of the variables, over a specified set • Give examples of polynomial identities • Extend polynomial identities to the complex numbers.	• **Honors classes do this if time allows**	On Core: Page 13 - 20

4.7 Complete the Square Pacing: **2 Days**	**A.REI.11**		http://www.acoe.org/acoe/files/EdServices/Completing%20the%20Square%20LessonV7PDF.pdf
4.8 Use the Quadratic Formula and the Discriminant Pacing: **2 Days**	**A.REI.11**		On Core: Page 21
4.9 Graph and Solve Quadratic Inequalities Pacing: **2 Days**	**A.CED.1 – Create equations and inequalities in one variable and use them to solve problems from a variety of contexts (e.g., science, history, and culture), including those of Montana American Indians. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.** • Solve inequalities in one variable **A.CED.3 – Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.** • Represent constraints by equations or inequalities, and by systems of equations and/or inequalities	**Find activities that include science, history, culture, and IEFA**	
4.10 Write Quadratic Functions and Models Pacing: **2 Days**	**A.REI.11** **A.CED.1** • Create equations and inequalities in one variable and use them to solve problems • Create equations and inequalities in one variable to model real-world situations • Create equations (linear, exponential) and inequalities in one variable and use them to solve problems	**Find activities that include science, history, culture, and IEFA**	

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

	A.CED.2 – Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. • Create at least two equations in two or more variables to represent relationships between quantities **A.CED.3** • Determine when a problem should be represented by equations, inequalities, systems of equations and/or inequalities **F.IF.8 – Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.** **a. Use the process of factoring and completing the square in a quadratic function to show zeroes, extreme values, and symmetry of the graph, and interpret these in terms of a context.** • Write a quadratic function defined by an expression in different but equivalent forms to reveal and explain various properties of the function and determine which form of the quadratic is the most appropriate for showing zeroes and symmetry of a graph in terms of a real-world context		
Chapter 4 Project Pacing: **1 Day**			CSI:Parabola Find See McDougall Littell EasyPlanner Explorations in Core Math Performance Task Pages 103-104 See"On Core Mathematics" Focus on Modeling at the end of most chapters

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

Assessment Pacing: **3-4 days** **Total: 24 days**			

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

Chapter 5: Polynomials & Polynomial Functions

Objectives:

The student will be able to:
- Graph polynomial functions, by hand in simple cases or using technology for more complicated cases, and identify key features
- Apply arithmetic operations of addition, subtraction, and multiplication to polynomials
- Factor polynomials using any available method
- Define the remainder theorem for polynomial division and divide polynomials
- Use long division to rewrite simple rational expressions in different forms
- Use synthetic substitution to find rational zeroes (use technology as a tool for more complex solutions)
- Create equations in 2 variables to represent relationships between quantities using technology

Essential Questions:
- What are the key features of a polynomial function and how can you use them to graph?
- How do the sum, difference, and product of two polynomials prove closure under the operations of addition, subtraction, and multiplication?
- How can you use the x-intercepts and asymptotes to construct a rough graph of a polynomial function?
- When is synthetic substitution a preferred method of solving a polynomial?
- What are the similarities and differences between long division and synthetic division?

Textbook Resource	CCSS	Comments	Other Resources
5.2 Evaluate and Graph Polynomial Functions Pacing: **1 Day**	**F.IF.7 – Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.** • Graph polynomial functions, by hand in simple cases or using technology for more complicated cases, and show/label maxima and minima of the graph, identify zeroes when suitable factorizations are available, and show end behavior • Graph polynomial functions, by hand in simple cases or using technology for more complicated cases, and show/label maxima and minima of the graph, identify zeroes when suitable factorizations are available, and show end behavior **F.BF.3– Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.** **F.IF.4 - For a function that models a relationship between two quantities, interpret key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.** • Define and recognize key features in tables and graphs of linear and exponential functions; intercepts; intervals where the function is increasing, decreasing, positive, or negative, and end behavior	**F.IF.4 needs to be supplemented** **Only include the basic idea of even/odd function.**	CSI: Polynomial Functions On Core: Page 71 - 88

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

5.3 Add, Subtract, and Multiply Polynomials Pacing: **1 Day**	**A.APR.1 - Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations addition, subtraction, and multiplication; add, subtract, and multiply polynomials**. • Define Closure • Identify that the sum, difference, or product, of two polynomials will always be a polynomial, which means that polynomials are closed under the operations of addition, subtraction and multiplication. • Apply arithmetic operations of addition, subtraction, and multiplication to polynomials.	**Extend beyond the quadratic polynomials found in Algebra 1**	On Core: Page 89 96
5.4 Factor and Solve Polynomial Equations Pacing: **2 Days**	****A.APR.3 – Identify zeroes of polynomials when suitable factorizations are available, and use the zeroes to construct a rough graph of the function defined by the polynomial.** • Factor polynomials using any available method • Create a sign chart for a polynomial f(x) using the polynomial's x-intercepts and testing the domain intervals for which f(x) greater than and less than zero • Use the x-intercepts of a polynomial function and the sign chart to construct a rough graph of the function ****A.APR.4 – Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity $(x^2+ y^2)^2 = (x^2 – y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples.** • Explain that an identity shows a relationship between two quantities or expressions, that is true for all values of the variables, over a specified set • Prove polynomial identities • Use polynomial identities to describe numerical relationships **A.REI.11** **A.SSE.2 – Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 – y^4$ as $(x^2)^2 – (y^2)^2$, thus recognizing**	**Generate Pythagorean Triples not covered in text**	

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

	it as a difference of squares that can be factored as $(x^2 – y^2)(x^2 + y^2)$. • Identify ways to rewrite expressions, such as difference of squares, factoring out a common monomial, and regrouping • Identify various structures of expressions • Use the structure of an expression to identify ways to rewrite it • Classify expressions by structure and develop strategies to assist in classification		
5.5 Apply the Remainder and Factor Theorems Pacing: **2 Days**	****A.APR.2 – Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder of division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x).** • Define the remainder theorem for polynomial division and divide polynomials • Given a polynomial p(x) and a number a, divide p(x) by (x-a) to find p(a), then apply the remainder theorem and conclude that p(x) is divisible by x - a, if and only if p(a) = 0 ****A.APR.6 – (+) Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.** • Use inspection, long division, and/or computer program to rewrite simple rational expressions. **A.REI.11**		On Core: Page 103
5.6 Find Rational Zeros Pacing: **2 Days**	**A.APR.3** **A.REI.11**		On Core: Page 109 -119

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

5.7 Apply the Fundamental Theorems of Algebra Pacing: **1 Day**	****N.CN.9 – (+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.** • State, in written or verbal form, the Fundamental Theorem of Algebra • Verify that the Fundamental Theorem of Algebra is true for second degree quadratic polynomials		
5.8 Analyze Graphs of Polynomial Functions Pacing: **2 Days**	**F.IF.4 - For a function that models a relationship between two quantities, interpret key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; ~~and periodicity.~~** • Define and recognize key features in tables and graphs of linear and exponential functions; intercepts; intervals where the function is increasing, decreasing, positive, or negative, and end behavior • Define and recognize key features in tables and graphs of linear, exponential, and quadratic functions: intercepts; intervals where the function is increasing, decreasing, positive, or negative, relative maximums, symmetries, end behavior and periodicity • Identify the type of function, given a table or graph • Interpret key features of graphs and tables of functions in terms of the contextual quantities each function represents • Sketch graphs showing the key features of a function, modeling a relationship between two quantities, given a verbal description of the relationship ****A.APR.3 – Identify zeroes of polynomials when suitable factorizations are available, and use the zeroes to construct a**	**This section needs to be supplemented to support CCSS.**	http://alex.state.al.us/lesson_view.php?id=24059

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

	rough graph of the function defined by the polynomial. •Create a sign chart for a polynomial f(x) using the polynomial's x-intercept and testing the domain intervals for which f(x) is greater than and less than zero •Use the x-intercepts of a polynomial function and the sign chart to construct a rough graph of the function **A.REI.11** **F.IF.7** **F.BF.3**	**Sign chart not in text. Must be supplemented**	
5.9 Write Polynomial Functions and Models Pacing: **1 Day**	**A.REI.11** **A.CED.2 – Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.** • Identify the quantities in a mathematical problem or real-world situation that should be represented by distinct variables and describe what quantities the variable represent • Graph one or more created equation on coordinate axes with appropriate labels and scales • Justify which quantities in a mathematical problem or real-world situation are dependent and independent of one another and which operations represent those relationships • Determine appropriate units for the labels and scale of graph depicting the relationship between equations created in two or more variables • Create at least two equations in two or more variables to represent relationships between quantities • Combine two functions using the operations of addition, subtraction, multiplication, and division • Evaluate the domain of the combined function		http://alex.state.al.us/lesson_view.php?id=24059

Chapter 5 Project Pacing: **1 Day**			Rational Functions Matching See McDougall Littell EasyPlanner Explorations in Core Math Performance Task Pages 183-184 See"On Core Mathematics" Focus on Modeling at the end of most chapters
Assessment Pacing: **3-4 days** **Total: 17 days**			

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

Chapter 6: Rational Exponents & Radical Functions

**Note: Regular ended the semester at 6.3, Honors finished Chap 6

Objectives:

Students will be able to:

- Solve rational and radical equations in one variable, and give examples showing how extraneous solutions may arise
- Apply the properties of rational exponents and perform function operations
- Find inverse functions
- Graph square root and cube root functions
- Solve simple radical equations in one variable

Essential Questions:

- How do you use inverse operations to solve rational and radical equations?
- How do the concepts of nth roots relate with rational exponents?
- Why is it necessary to check the possible solutions extraneous roots when solving a radical equation?

Textbook Resource	CCSS	Comments	Other Resources
6.1 Evaluate nth Roots and Use Rational Exponents Pacing: **1 Day**	**A.REI.2 – Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.** • Determine the domain of a rational function • Determine the domain of a radical function • Solve radical equations in one variable • Solve rational equations in one variable • Give examples showing how extraneous solutions may arise when solving rational and radical equations		On Core: Page 9

6.2 Apply Properties of Rational Exponents Pacing: **1 day**	**N.RN.1** **N.RN.2**	**Teach concept but don't use textbook as resource**	On Core: 9
6.3 Perform Function Operations and Composition Pacing: **1 Day**	**F.BF.1 – Write a function that describes a relationship between two quantities.** **b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.** • Combine two functions using the operations of addition, subtraction, multiplication, and division • Evaluate the domain of the combined function • Given a real-world situation or mathematical problem, build standard functions to represent relevant relationships/quantities • Given a real-world situation or mathematical problem, determine which arithmetic operation should be performed to build the appropriate combined function • Given a real-world situation or mathematical problem, relate the combined function to the context of the problem		
Christmas Break?	**This could be semester break instead of Christmas break. This is where Regular Alg 2 made it to for 2013/2014. We'll revisit timing Summer 2015.**		

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

6.4 Use Inverse Functions Pacing: **2 Days**	**F.BF.4 – Find the inverse functions.** **a. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example: f(x) = $2x^3$ or fx = (x+1)/(x-1) for x ≠ 1.** • Define inverse function • Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse	**Alg 1 introduces inverse in linear functions.**	On Core: Page 171
6.5 Graph Square Root ~~and Cube Root Functions~~ Pacing: **1 Day**	****F.BF.3 – Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.** **F.IF.5 – Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.** • Identify and describe the domain of a function, given the graph or a verbal/written description of a function • Identify an appropriate domain based on the unit, quantity, and type of function it describes • Relate the domain of a function to its graph and to the quantitative relationship it describes, where applicable • Explain why a domain is appropriate for a given situation		On Core: Page 177 -194
6.6 Solve Radical Equations Pacing: **2 Days**	****A.REI.2 – Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.** • Determine the domain of a rational function • Determine the domain of a radical function • Solve radical equations in one variable		On Core: Page 207

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

	• Solve rational equations in one variable • Give examples showing how extraneous solutions may arise when solving rational and radical equations **A.REI.11**		
Chapter 6 Project Pacing: **1 Day**			See McDougall Littell EasyPlanner Need performance task for Chapter 14 See"On Core Mathematics" Focus on Modeling at the end of most chapters
Assessment Pacing: **3 Days** **Total: 11 days**			
Semester Review & Final Exam - Chapters 1 - 6 Pacing: **5 Days** **Total: 86 Days**			

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

Semester 2
Chapter 7: Exponential & Logarithmic Functions

Objectives:

Students will be able to:

- Graph exponential and logarithmic functions, by hand in simple cases, or using technology for more complicated cases, and show intercepts and end behavior
- Identify how key features of an exponential function relate to its characteristics in real context
- Recognize and know the definition of logarithmic functions
- Recognize the laws and properties of logarithms including change of base
- Evaluate a logarithm
- Solve exponential and logarithm equations in one variable

Essential Questions:

- How do you use the concept of exponential growth to work with the principle of compound interest?
- How do you convert between exponential and logarithmic form?
- How do you use the inverse relationship between exponential and logarithmic functions to solve equations?

Textbook Resource	CCSS	Comments	Other Resources
7.1 Exponential Growth Pacing: **2 Days**	**F.IF.7 - Graph exponential functions, by hand in simple cases, or using technology for more complicated cases, and show intercepts and end behavior.** **F.IF.4 - Identify the type of function, given a table or graph** **F.IF.6 - Estimate the rate of change from a linear or exponential graph** **F.IF.8 - Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)12^t$, $y = (1.2)/10$, and classify them as representing exponential growth or decay.** • Classify the exponential function as exponential growth or decay by examining the base • Identify how key features of an exponential function relate to its characteristics in a real world context. • Given an exponential expression, interpret it in terms of a real-world context, using properties of exponents • Write an exponential function defined by an expression in different but equivalent forms to reveal and explain different properties of the function and determine which form is most appropriate (ie $y = ab^x$; $y=Pe^{rt}$; etc) **F.IF.9 - Differentiate between exponential and linear functions using a variety of descriptors (graphical, verbal, numerical, algebraic).**	**Find rate of change of exponential graph is not in text**	http://math.rice.edu/~lanius/pro/rich.html http://alex.state.al.us/lesson_view.php?id=24092 On Core: Page 219-242
7.2 Exponential Decay Pacing: **1 Day**	**F.IF.7** **F.IF.4** **F.IF.6** **SEE ABOVE** **F.IF.8** **F.IF.9**	**Do rate of change with exponential functions**	**http://illuminations.nctm.org/LessonDetail.aspx?id=L829** **http://alex.state.al.us/lesson_view.php?id=24092**

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

	F.BF.1 - Write a function that describes a relationship between two quantities (For example build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential function, and relate these functions to the model)		On Core: Page 219-242
7.3 Functions involving *e* Pacing: **1 Day**	**A.SSE.1 - Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P**	**Functions involving e have never been seen before.**	On Core: Page 243
7.4 Graph Logarithms Pacing: **2 Days**	**F.IF.7** • Compare and contrast the domain and range of exponential, (and) logarithmic functions • Analyze the difference between simple and complicated exponential (and) logarithmic functions **F.BF.4 - Define inverse functions.** • Recognize and know the definition of logarithmic functions	**Logarithms have never been seen before.**	On Core: Page 261-271
7.5 Properties of Logarithms Pacing: **2 Days**	****F.LE.4 Express a log as the solution to $ab^{ct}=d$** • Recognize the laws and properties of logarithms, including change of base. • Recognize and know the definition of logarithmic functions • Recognize and know the definition of logarithm base b • Evaluate a logarithm using technology • For exponential models, express as a logarithm, the solution to $ab^{ct}=d$, where a, b, and d are numbers and the base b is 2, 10, or e.		On Core: Page 273
7.6 Solve exponential and logarithmic functions Pacing: **2 Days**	**A.CED.1** • Solve … exponential equations in one variable. • Create exponential equations and use them to solve problems	**Find activities that include science, history, culture, and IEFA**	On Core: Page 277
7.7 Write and apply ~~(Power~~	**F.IF.7**	**Do rate of change with**	**http://www.nuffieldfoundatio**

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

~~and)~~ Exponential Functions Pacing: **1 Day**	**F.IF.4** **F.IF.6** **F.IF.8** **F.BF.1**	**exponential functions**	**n.org/sites/default/files/files/FSMA%20Exponential%20rates%20of%20change%20student.pdf**
Chapter 7 Project Pacing: **1 Day**			The Way a Ball Bounces Explorations in Core Math Performance Task Pages 253-254 See "On Core Mathematics" Focus on Modeling at the end of most chapters
Assessment Pacing: **3 days** **Total: 15 days**			

Do Chapters 13 and 14 before Chapter 8 for testing purposes.

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

Chapter 13: Trigonometric Ratios & Functions

Objectives:

Students will be able to:

- Recognize which methods could be used to solve right triangles in applied problems
- Determine values of the trigonometric functions of an angle in standard position
- Define trigonometric ratios as related to the unit circle
- Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers
- Define a radian measure of an angle as the length of the arc on the unit circle subtended by the angle
- Solve a triangle using law of sines and law of cosines

Essential Questions:

- How do you use right triangle trigonometric ratios to find missing sides or angles of right triangles?
- How do you convert angle measures between degrees and radians and why would this conversion be necessary?
- How are special right triangles used to find the values of trigonometric functions on the unit circle?
- How do you know when to use law of sines vs. law of cosines to solve a triangle?

Textbook Resource	CCSS	Comments	Other Resources
13.1 Use Trigonometry with Right Triangles 13.4 Examples 3 & 4 right triangles only Pacing: **2 Days**	**G.SRT.8- Use trigonometric ratios and Pythagorean Theorem to solve right triangles in applied problems.** • Recognize which methods could be used to solve right triangles in applied problems. • Solve for an unknown angle or side of a right triangle using sine, cosine, and tangent. • Apply right triangle trigonometric ratios and Pythagorean theorem to solve right triangles in applied problems.	**Right triangle trig is in Geometry not Alg2. Review here for the purpose of leading into Unit Circle.**	http://www.mathematicsvisionproject.org/ Secondary Math - Module 6, useful pages 39-42, 44, 45, 47, 49-55 Interactive applet allows students to discover trig ratios: http://tube.geogebra.org/student/m32475 On Core: Page 301
13.2 Define General Angles and Use Radian Measure Pacing: **2 Days**	****F.TF.8 – Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find sin (θ), cos (θ), or tan (θ), given sin (θ), cos (θ), or tan (θ), and the quadrant of the angle.** • Define trigonometric ratios as related to the unit circle • Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ • Use the Pythagorean identify, $\sin^2(\theta) + \cos^2(\theta) = 1$, to find sin(θ), cos (θ), or tan (θ), given sin (θ), cos (θ), or tan (θ), and the quadrant of the angle ****F.TF.1 – Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.** • Define a radian measure of an angle as the length of the arc on the unit circle subtended by the angle • Define terminal and initial side of an angle on the unit circle ****F.TF.2 – Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed**	**Develop supplemental material to support the Pythagorean identity.**	**Trig Function Graphs** On Core: Page 293-300

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

	counterclockwise around the unit circle. • Explain the relationship between a counterclockwise radian measure of an angle along the unit circle, terminal coordinate on the unit circle of that angle, and the associated real number.		
13.3 Evaluate Trigonometric Functions of Any Angle Pacing: **2 Days**	**F.TF.1 – Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.** • Define a radian measure of an angle as the length of the arc on the unit circle subtended by the angle • Define terminal and initial side of an angle on the unit circle **F.TF.2 – Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.** • Explain the relationship between a counterclockwise radian measure of an angle along the unit circle, terminal coordinate on the unit circle of that angle, and the associated real number • Explain how radian measures of angles of the unit circle in the coordinate plane enable the extension of trigonometric functions to all real numbers		interactive applet shows SIN COS and TAN on the unit circle: http://www.geogebra.org/en/upload/files/english/David%20Cox/trig_circle.html http://alex.state.al.us/lesson_view.php?id=27478 On Core: Page 307
13.4 Evaluate Inverse Trigonometric Functions Pacing: **1 day**	**G.SRT.8**	**This was taught in Geometry**	
13.5 Apply the Law of Sines Pacing: **1 day**	****G.SRT.10 – Prove the Law of Sines and Cosines and use them to solve problems.** ****G.SRT.11 – Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces)**	G.SRT.10 (+) and G.SRT.11 (+)	AintNoRiverWide (TI-Nspire)
13.6 Apply the Law of Cosines Pacing: **1 day**	**G.SRT.10** **G.SRT.11**	G.SRT.10 (+) and G.SRT.11 (+)	

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

Chapter 13 Project Pacing: **1 Day**			Measure Heights of Objects See EasyPlanner Explorations in Core Math Performance Task Pages 595-596 See"On Core Mathematics" Focus on Modeling at the end of most chapters
Assessment Pacing: **3 days** **Total: 13 Days**		Quiz, review, test	

.

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

Chapter 14: Trigonometric Graphs, Identities, & Equations

Objectives:

Students will be able to:

- Recognize and graph trigonometric functions showing period, midline, amplitude and asymptotes when appropriate

Essential Questions:

- How do you determine which trigonometric function is graphed on a plane?

Textbook Resource	CCSS	Comments	Other Resources
14.1 Graph Sine, Cosine, and Tangent Functions Pacing: **2 Days**	**F.IF.7 – Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases** • Graph ~~exponential, logarithmic, and~~ trigonometric functions, by hand in simple cases or using technology for more complicated cases. For exponential and logarithmic functions, show: period, midline, and amplitude ****F.TF.5 – Choose trigonometric functions to model periodic phenomena from a variety of contexts (e.g., science, history, culture, including those of the Montana American Indian) with specified amplitude, frequency, and midline.** • Define and recognize amplitude, frequency, and midline parameters in a symbolic trigonometric function • Interpret the parameters of a trigonometric function (amplitude, frequency, midline) in the context of real-world situations • Choose trigonometric functions to model periodic phenomena for		Interactive applet shows graph of y= a TAN (bx+c). Students can navigate sliders. http://www.geogebratube.org/student/m6725 Interactive applet shows graph of y = a sin (bx -c). Students can navigate sliders: http://www.ies-math.com/math/java/trig/ABCsinX/ABCsinX.html ProofOfIdentity(TI84) http://illuminations.nctm.org/ActivityDetail.aspx?ID=174

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

	which amplitude, frequency, and midline are already specified • Explain why real-world or mathematical phenomena exhibit characteristics of periodicity		On Core: Page 311-324
14.2 Translate and Reflect Trigonometric Graphs Pacing: **2 Days**	**F.IF.7 – Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.** • Graph ~~exponential, logarithmic, and~~ trigonometric functions by hand in simple cases or using technology for more complicated cases. For exponential and logarithmic functions, show: period, midline, and amplitude **F.TF.5 – Choose trigonometric functions to model periodic phenomena from a variety of contexts (e.g., science, history, culture, including those of the Montana American Indian) with specified amplitude, frequency, and midline.** • Define and recognize amplitude, frequency, and midline parameters in a symbolic trigonometric function • Interpret the parameters of a trigonometric function (amplitude, frequency, midline) in the context of real-world situations • Choose trigonometric functions to model periodic phenomena for which amplitude, frequency, and midline are already specified • Explain why real-world or mathematical phenomena exhibit characteristics of periodicity		On Core: Page 325
Chapter 14 Project Pacing: **1 Day**			See McDougall Littell EasyPlanner Biorhythms Need performance task for Chapter 14 See "On Core Mathematics" Focus on Modeling at the end of most chapters

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

Assessment Pacing: **2 Days** **Total: 7 days**			

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

Chapter 8: Rational Functions

Objectives:

Students will be able to:

- Recognize and use function notation to represent rational equations
- Graph simple rational functions by hand and general rational functions using technology
- Add, subtract, multiply, and divide rational expressions
- Solve simple rational equations in one variable, identifying how extraneous solutions may arise

Essential Questions:

- How do you find asymptotes of a rational function?
- How do you find x-intercepts of a rational function?
- How do you know when a rational expression can be simplified?
- Why is it necessary to check the possible extraneous solutions when solving a rational equation?

Textbook Resource	CCSS	Comments	Other Resources
8.2 Graph Simple Rational Functions Pacing: **1 Day??**	**A.REI.11 - Recognize and use function notation to represent rational equations** • Approximate/find the solution(s) using an appropriate method. For example, using technology to graph the functions, make tables of values or find successive approximations ****F.BF.4 - Build new functions from existing functions. Use transformations of functions to find models as students consider increasingly more complex situations. Extend F.BF.4a , to simple rational, simple radical, and simple exponential functions; connect F.BF.4a to F.IF.4**	**Finding the inverse of a function is found in Sect. 6.4 and Sect. 7.4 for other types of functions. Also find the inverse of a rational function (need resources for this).**	On Core: Page 131 - 148
8.3 Graph General Rational Functions Pacing: **2 Days**	**A.REI.11 - Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions**		
8.4 Multiply and Divide Rational Expressions Pacing: **2 Days**	****A.APR.6(+) – Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.** **A.APR.7(+) – Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.** • Add, subtract, multiply, and divide rational expressions • Informally verify that rational expressions form a system analogous	**Long division is new.**	On Core: Page 153

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

	to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression		
8.5 Add and Subtract Rational Expressions Pacing: **2 Days**	**A.APR.6 (+)** **A.APR.7 (+)**		On Core: Page 149
8.6 Solve Rational Equations Pacing: **2 Days**	****A.REI.2 – Solve simple rational equations in one variable, and give examples showing how extraneous solutions may arise.** • Determine the domain of a rational function • Solve rational equations in one variable • Give examples showing how extraneous solutions may arise when solving rational equations **A.CED.1 – Create equations and inequalities in one variable and use them to solve problems from a variety of contexts (e.g., science, history, and culture), including those of Montana American Indians. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.** **A.REI.11 - Approximate/find the solution(s) using an appropriate method. For example, using technology to graph the functions, make tables of values or find successive approximations**	**Find activities that include science, history, culture, and IEFA**	On Core: Page 157
Chapter 8 Project Pacing: **1 Day**			Explorations in Core Math Performance Task Pages 321-322
Assessment Pacing: **3 days** **Total: 13 days**			

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

Chapter 11: Data Analysis & Statistics

Objectives:

Students will be able to:

- Recognize the purpose of surveys, experiments, and observational studies in making statistical inferences and justifying statistical conclusions
- Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages
- Describe the characteristics of a normal distribution
- Understand statistics as a process for making inferences about population parameters based on a random sample from that population
- Define margin of error
- Identify data or discrepancies that provide the basis for rejecting a statistical model

Essential Questions:

- What are the different ways in which data can be organized and analyzed?
- How can you use the normal curve to find probabilities of an event?
- How can you use z-scores to find probabilities of an event?
- How can you use a sample survey to estimate a population mean or proportion and develop a margin of error?
- How do you know when to accept or fail to accept a statistical claim?

Textbook Resource	CCSS	Comments	Other Resources
11.1 Find Measures of Central Tendency and Dispersion Pacing: **1 Day**	**S.ID.4 – Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables, and American Indian data sources to estimate areas under the normal curve.** • Use the mean and standard deviation of a data set to fit it to a normal distribution	**Main focus: standard deviation and mean, median, mode (11.3 will cover the areas under the curve) Add: how measures of central tendency fit into normal distributions (normal distribution covered tomorrow) & IEFA resources - buffalo/population**	Population: http://www.opi.mt.gov/pdf/IndianEd/Search/Mathematics/G11%20Montana%20Native%20American%20Population.pdf (also in shared dropbox) StandardDeviation MeasureOfHair-Ch. 11 Dropbox
11.3 Use Normal Distributions Pacing: **3 Days** (11.3A Activity, 11.3 Lesson, 11.3B Activity)	**S.ID.4** • Describe the characteristics of a normal distribution • Use a normal distribution to estimate population percentages • Use a calculator, spreadsheet, and table to estimate areas under the normal curve ****S.IC.2 – Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?** • Recognize data that various models produce ****S.MD.6(+) – Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator)** ****S.MD.7(+) – Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).**	**For S.ID.4, include 11.3 B (CC33) Activity and for S.IC.2, include 11.3A Activity (from Algebra 2 CCSS textbook supplement) May need more for spreadsheets & calculators for areas under the normal curve**	On Core: Page 381 and 393

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

11.4 Select and Draw Conclusions from Samples Pacing: **2.5 Days** (11.4 Lesson, 11.4 A Activity, 11.4 Extension)	**S.ID. 4** • Recognize that there are data sets for which such a procedure is not appropriate ****S.IC.1 – Understand statistics as a process for making inferences about population parameters based on a random sample from that population.** • Explain that statistics is a process for making inferences about population parameters, or characteristics • Explain that statistical inferences about population characteristics are based on random samples from that population **S.IC.2** • Use various, specified data-generating processes/models • Identify data or discrepancies that provide the basis for rejecting a statistical model ****S.IC.4 – Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.** • Define margin of error • Explain the connection of margin of error to variation within a data set or population • Interpret the data generated by a simulation model for random sampling in terms of the context the simulation models • Develop a margin of error, assuming certain population parameters/characteristics, through the use of simulation models for random sampling • Use a simulation model to generate data for random sampling, assuming certain population parameters/characteristics	**For S.IC.1, include 11.4A Activity 11.4A (from Algebra 2 CCSS textbook supplement)** **11.4A Estimate a Population Proportion CC34-CC35** **10.6A Use a Simulation to Test an Assumption (CC28-CC29)**	See airline and salary questions from Smarter Balanced released questions On Core: Page 375

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

11.5A Compare Surveys, Experiments, and Observational Studies Pacing: **3 Days** (11.5A Lesson & 11.5B Activity)	**S.ID. 4** • Recognize that there are data sets for which such a procedure is not appropriate ****S.IC.3 – Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.** • Recognize the purpose of surveys, experiments, and observational studies in making statistical inferences and justifying conclusions and explain how randomization relates to each of these methods of data collection • Recognize the differences among surveys, experiments, and observational studies in making statistical inferences and justifying conclusions and explain how randomization relates to each of the methods of data collection	**Supplemental section from Algebra 2 CCSS textbook supplement, include 11.5B (CC36-CC43) Activity from supplemental textbook resource**	On Core: Page 399-418
11.5 Choose the Best Model for Two-Variable Data Pacing: **1 Day** (incorporate 11.5 Activity)	**F.IF.7 – Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.** • Select the appropriate type of function, taking into considerations the key features, domain, and range, to model a real-world situation **S.IC.2** • Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation.	**Include 11.5 Activity to incorporate ideas on calculator**	On Core: Page 419
Statistics resources??? Pacing: **3 Days**	**S.IC.4** • Use data from a sample survey to estimate a population mean or proportion ****S.IC.5 – Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between two parameters are significant.** • Using an established level of significance, determine if the difference between two parameters is significant	**On Core supplement available for population mean & proportion.**	

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

	• Choose appropriate methods to simulate a randomized experiment • Establish a reasonable level of significance • Use data from a randomized experiment to compare two treatments ****S.IC.6 – Evaluate reports based on data.** • Define the characteristics of experimental design (control randomization, and replication) • Evaluate experimental study design, how data was gathered, and what analysis (numerical or graphical) was used • Draw conclusions based on graphical and numerical summaries • Support with graphical and numerical summaries how appropriate the report of data was		
Chapter 11 Project Pacing: **1 Day**			See McDougall Littell EasyPlanner Explorations in Core Math Performance Task Pages 495-496 See"On Core Mathematics" Focus on Modeling at the end of most chapters
Assessment Pacing: **3 Days** **Total: 17.5 Days**			

Chapter 12: Sequences & Series

Objectives:

Students will be able to:

- Define and use sequences and series
- Analyze arithmetic and geometric sequences and series
- Find sums of finite arithmetic and geometric series
- Find sums of infinite geometric series
- Define explicit function and recursive process

Essential Questions:

- How do you find the first term in an arithmetic or geometric sequence given at least two other terms?
- How can you write an arithmetic or geometric formula (explicit or recursive) given the first term and the common difference or ratio?
- How do you find the sum of a series using summation notation?
- How do convert a sequence to summation notation?

Textbook Resource	CCSS	Comments	Other Resources
12.1 Define and Use Sequences and Series Pacing: **1 Day**	**F.BF.1 – Write a function that describes a relationship between two quantities.**	**Review vocabulary to prepare for upcoming concepts, can use 12.1 Activity also**	On Core: Page 342
12.2 Analyze Arithmetic Sequences and Series Pacing: **1 Day**	**F.BF.1** **a. Determine an explicit expression, a recursive process, or steps for calculation from a content.**	**Review vocabulary to prepare for upcoming concepts**	On Core: Page 347

Note: If a chapter section is not listed, it is meant to be skipped.
~~Strike-through~~ means that the standard appears at a different time.
**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

12.3 Analyze Geometric Sequences and Series Pacing: **2 Days**	****A.SSE.4 – Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.** • Find the first term in a geometric sequence given at least two other terms • Define a geometric series as a series with a constant ratio between successive terms • Use the formula S + a (1-rn)/(1-r) to solve problems • Derive a formula [i.e., equivalent to the formula S + a (1-rn)/(1–r)] for the sum of a finite geometric series (when the common ratio is not 1)		On Core: Page 353 and 359
12.4 Find Sums of Infinite Geometric Series Pacing: **1 Day**	**A.SSE.4**	If time allows, can include 12.4 Activity	Activity in Ch. 12 Dropbox folder.
12.5 Use Recursive Rules with Sequences and Functions Pacing: **2 Days** (12.5 Lesson, 12.5 Activity, 12.5A Extension)	**F.BF.1 – Write a function that describes a relationship between two quantities.** **a. Determine an explicit expressions, a recursive process, or steps for calculation from a context.** **b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.** • Define explicit function and recursive process	12.5A Activity is in Algebra 2 CCSS textbook supplement	RecursiveSequence (TI-Nspire) http://illuminations.nctm.org/LessonDetail.aspx?id=U184

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.

Chapter 12 Project Pacing: **1 Day**			See McDougall Littell EasyPlanner Explorations in Core Math Performance Task Pages 547-548 See"On Core Mathematics" Focus on Modeling at the end of most chapters
Assessment Pacing: **3 Days** **Total: 11 Days**			
Semester Review & Final Exam - Chapters 7-14 omit ch.9.10 Pacing: **5 Days** **Total: 78 Days**			

Note: If a chapter section is not listed, it is meant to be skipped.

~~Strike-through~~ means that the standard appears at a different time.

**This is the first time students are seeing this ever. Develop this standard to an appropriate level for the class.